

SUBSTITUTE SEQUENCE LISTING

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<120> CYTOTOXIN-BASED BIOLOGICAL CONTAINMENT

<130> PLOUG1.001APC

<140> US 09/700,130

<141> 2000-11-07

<150> PCT/DK99/00258

<151> 1999-05-07

<150> DK 0627/98

<151> 1998-05-07

<150> US 60/085,067

<151> 1998-05-12

<160> 59

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 51

<212> DNA

<213> Artificial Sequence

<220>

<223> primer relE1B was used for the amplification of  
relEK-12 by PCR on pBD2430

<400> 1

ccccgatcc ataaggagtt ttataaatgg cgtattttct ggattttgac g

51

<210> 2

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> primer relE1B was used for the amplification of  
relEK-12 by PCR on pBD2430

<400> 2

ccccctcga ggtcgactca gagaatgcgt ttgaccgc

38

<210> 3

<211> 28  
<212> DNA  
<213> Artificial Sequence  
<220>  
<223> primer RelB-p307/1 was used for the generation of  
a PCR-fragment from pNZ945

<400> 3  
cccccgatc ccagtcttga aaggtggc 28

<210> 4  
<211> 29  
<212> DNA  
<213> Artificial Sequence  
<220>  
<223> primer RelB-p307/2 was used for the generation of  
a PCR-fragment from pNZ945

<400> 4  
ccccccaatt ctcattagga tttatccag 29

β<sup>γ</sup>  
<210> 5  
<211> 27  
<212> DNA  
<213> Artificial Sequence  
<220>  
<223> primer relE-p307/3 was used to PCR-amplify the  
gene relEP307 from pNZ945

<400> 5  
ccccgatcc agatctggat aaatacc 27

<210> 6  
<211> 32  
<212> DNA  
<213> Artificial Sequence  
<220>  
<223> primer relE-p307/2 was used to PCR-amplify the  
gene relEP307 from pNZ945

<400> 6  
ccccgaatt cgtaactttc tgtgtttatt gc 32

<210> 7  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>

<223> primer relE-p307/4 was used for the generation of  
a DNA fragment encoding relEP307 by PCR

<400> 7

cccccgagct cagatctgga taaataacc

28

<210> 8

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer relE-P307/5 was used for the generation of  
a DNA fragment encoding relEP307 by PCR

<400> 8

ccccgcgatg cgtaactttc tgtgtttatt gc

32

<210> 9

<211> 1444

<212> DNA

<213> E. coli K-12

<220>

<221> misc\_feature

<222> (1)...(1444)

<223> n = A,T,C or G

<400> 9

cttaatttca ggccccatcg gatcacacat ggagagtttt tatgaataac cccgtctgtc 60  
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tttctgccgc atgcgggtgt tgcataaaac gtgttacggt cctttatcga cagggtcagg 180  
caccgctcac ccgccgacga gaaagcaaca ctgacatgct aaagcaaaaa atagatgaat 240  
aagttgagtt gtgcatatgt agcctgaccg tcacaaagta tatggtgtct gtaccagtaa 300  
gatgatggcc ggactcttta aaaacgagct gacctgcaca atacaggatg gacttagcaa 360  
tggctgctcc tggcacaag cgacagtgta tcaccgttct tacgactact ttctgacttc 420  
cttcgtgact tggcctaagc atggtttagt rbmrnarbst artgcgatac ttgtaatgac 480  
atltgtaatt acaagagggtg taagacatgg gtargcatta acctgcgtat tgacgatgaa 540  
cttaaagcgc gttcttacgc cgcgcttgaa aaaatgggtg taactccttc tgaagcgctt 600  
cgtctcatgc tcgagtatat cgctgacaat gaacgcttgc cgttcaaaca gacactcctg 660  
agtgatgaag atgctgaact tgtggagata gtgaaagaac ggcttcgtaa tcctndrbst 720  
artraagcca gtacgtgtga cgctggatga actctgatgg cgtattttct ggattttgac 780  
gagcgggcac taaaggaaatg gcgaaagctg ggctcgacgg tacgtgaaca gttgaaaaag 840  
aagctgggtg aagtacttga gtcaccccg attgaagcaa acaagctccg tggatgcct 900  
gattgttaca agattaagct ccggtcttca ggctatcgcc ttgtatacca gggtatagac 960  
gagaaagttg tcgttttcgt gatttctggt gggaaaagag aacgctcgga agtatatagc 1020  
gaggndrcgg tcaaacgcgt tctctgaacc aaagcatgac atctctgttt cgcaccgsta 1080  
rthkcraagg tgacacttct gctttgcgtt gacaggagaa gcaggctatg aagcagcaaa 1140  
aggcgtatgt aatcgccctg atcgctatct gtttaaccgt catagtgcag gcaactggtaa 1200  
cgaggaaaga cctctgcgag gtacgaatcc gaaccgndhk caccagacgg aggtcgctgt 1260  
cttcacagct tacgaacctg aggagtaaga gaccggcggg gggagaaatc cctcgccacc 1320  
tctgatgtgg caggcatcct caacgcaccc gcacttaacc cgcttcggcg gggttttgtt 1380  
tttattttca arttcgcgtt tgaagttctg gacggtgccg gaatagaatc aaaaataact 1440

aagt

&lt;210&gt; 10

&lt;211&gt; 88

&lt;212&gt; PRT

&lt;213&gt; Methanococcus jannaschii #2

&lt;220&gt;

&lt;223&gt; protein relE-Mj2

&lt;400&gt; 10

Met Lys Val Leu Phe Ala Lys Thr Phe Val Lys Asp Leu Lys His Val  
 1 5 10 15  
 Pro Gly His Ile Arg Lys Arg Ile Lys Leu Ile Ile Glu Glu Cys Gln  
 20 25 30  
 Asn Ser Asn Ser Leu Asn Asp Leu Lys Leu Asp Ile Lys Lys Ile Lys  
 35 40 45  
 Gly Tyr His Asn Tyr Tyr Arg Ile Arg Val Gly Asn Tyr Arg Ile Gly  
 50 55 60  
 Ile Glu Val Asn Gly Asp Thr Ile Ile Phe Arg Arg Val Leu His Arg  
 65 70 75 80  
 Lys Ser Ile Tyr Asp Tyr Phe Pro  
 85

&lt;210&gt; 11

&lt;211&gt; 91

&lt;212&gt; PRT

&lt;213&gt; Methanococcus jannaschii #3

&lt;220&gt;

&lt;223&gt; protein relE-Mj3

&lt;400&gt; 11

Met Lys Gln Trp Lys Tyr Leu Leu Lys Lys Ser Phe Ile Lys Asp Leu  
 1 5 10 15  
 Lys Glu Leu Pro Lys Asn Ile Gln Glu Lys Ile Lys Lys Leu Val Phe  
 20 25 30  
 Glu Glu Ile Pro Asn Lys Asn Asn Pro Pro Glu Ile Pro Asn Val Lys  
 35 40 45  
 Lys Leu Lys Gly Ala Asp Ser Tyr Tyr Arg Ile Arg Val Gly Asp Tyr  
 50 55 60  
 Arg Ile Gly Phe Lys Tyr Glu Asn Gly Lys Ile Val Phe Tyr Arg Val  
 65 70 75 80  
 Leu His Arg Lys Gln Ile Tyr Lys Arg Phe Pro  
 85 90

&lt;210&gt; 12

&lt;211&gt; 87

&lt;212&gt; PRT

&lt;213&gt; Archaeoglobus fulgidus #1

&lt;220&gt;

&lt;223&gt; protein relE-Afl

&lt;400&gt; 12

Met Phe Arg Val Val Val His Arg Lys Ala Thr Gln Glu Leu Lys Arg  
 1 5 10 15  
 Leu Lys Lys Ala His Leu Lys Lys Phe Gly Val Leu Leu Glu Thr Leu  
 20 25 30  
 Lys Thr Asp Pro Ile Pro Trp Lys Arg Phe Asp Val Lys Lys Ile Glu  
 35 40 45  
 Gly Glu Glu Asn Thr Tyr Arg Ile Arg Ile Gly Asp Phe Arg Val Ile  
 50 55 60  
 Tyr Phe Leu Asp Lys Pro Thr Lys Thr Val His Ile Leu Lys Val Glu  
 65 70 75 80  
 Arg Arg Gly Lys Val Tyr Asp  
 85

<210> 13  
 <211> 90  
 <212> PRT  
 <213> Methanococcus jannaschhii #1

<220>  
 <223> protein relE-Mjl

<400> 13  
 Met Lys Phe Asn Val Glu Ile His Lys Arg Val Leu Lys Asp Leu Lys  
 1 5 10 15  
 Asp Leu Pro Pro Ser Asn Leu Lys Lys Phe Lys Glu Leu Ile Glu Thr  
 20 25 30  
 Leu Lys Thr Asn Pro Ile Pro Lys Glu Lys Phe Asp Ile Lys Arg Leu  
 35 40 45  
 Lys Gly Ser Asp Glu Val Tyr Arg Val Arg Ile Gly Lys Phe Arg Val  
 50 55 60  
 Gln Tyr Val Val Leu Trp Asp Asp Arg Ile Ile Ile Ile Arg Lys Ile  
 65 70 75 80  
 Ser Arg Arg Glu Gly Ala Tyr Lys Asn Pro  
 85 90

<210> 14  
 <211> 74  
 <212> PRT  
 <213> Bacillus thuringiensis

<220>  
 <223> protein relE-Bt

<400> 14  
 Met Lys Phe Ile Ala Lys Gln Glu Lys Gly Ile Gln Lys Arg Ile Ala  
 1 5 10 15  
 Glu Gly Leu Lys Gly Leu Leu Lys Ile Pro Pro Glu Gly Asp Ile Lys  
 20 25 30  
 Ser Met Lys Gly Tyr Thr Glu Leu Tyr Arg Leu Arg Ile Gly Thr Phe  
 35 40 45  
 Arg Ile Leu Phe Glu Ile Asn His Asp Glu Lys Val Ile Tyr Ile Gln  
 50 55 60  
 Ala Ile Gly Asn Arg Gly Asp Ile Tyr Lys  
 65 70

<210> 15  
 <211> 95  
 <212> PRT  
 <213> E. coli plasmid P307

<220>  
 <223> protein relE-P307

<400> 15  
 Met Arg Tyr Gln Val Lys Phe Arg Glu Asp Ala Leu Lys Glu Trp Gln  
 1 5 10 15  
 Lys Leu Asp Lys Ala Ile Gln Gln Gln Phe Ala Lys Lys Leu Lys Lys  
 20 25 30  
 Cys Cys Asp Asn Pro His Ile Pro Ser Ala Lys Leu Arg Gly Ile Lys  
 35 40 45  
 Asp Cys Tyr Lys Ile Lys Leu Arg Ala Ser Gly Phe Arg Leu Val Tyr  
 50 55 60  
 Gln Val Ile Asp Glu Gln Leu Ile Ile Ala Val Val Ala Val Gly Lys  
 65 70 75 80  
 Arg Glu Arg Ser Asp Val Tyr Asn Leu Ala Ser Glu Arg Met Arg  
 85 90 95

<210> 16  
 <211> 82  
 <212> PRT  
 <213> E. coli K-12

<220>  
 <223> protein relEK-12

<400> 16  
 Met Ala Tyr Phe Leu Asp Phe Asp Glu Arg Ala Leu Lys Glu Trp Arg  
 1 5 10 15  
 Lys Leu Gly Val Leu Glu Ser Pro Arg Ile Glu Ala Asn Lys Leu Arg  
 20 25 30  
 Gly Met Pro Asp Cys Tyr Lys Ile Lys Leu Arg Ser Ser Gly Tyr Arg  
 35 40 45  
 Leu Val Tyr Gln Val Ile Asp Glu Lys Val Val Val Phe Val Ile Ser  
 50 55 60  
 Val Gly Lys Arg Glu Arg Ser Glu Val Tyr Ser Glu Ala Val Lys Arg  
 65 70 75 80  
 Ile Leu

<210> 17  
 <211> 96  
 <212> PRT  
 <213> Vibrio cholerae

<220>  
 <223> protein relE-Vc

<400> 17  
 Met Thr Tyr Lys Leu Glu Phe Lys Lys Ser Ala Leu Lys Glu Trp Lys

1                      5                      10                      15  
 Lys Leu Ala Val Pro Leu Gln Gln Gln Phe Lys Lys Lys Leu Ile Glu  
                          20                      25                      30  
 Arg Leu Glu Asn Pro His Val Pro Ser Ala Lys Leu Ser Gly Ala Glu  
                          35                      40                      45  
 Asn Ile Tyr Lys Ile Lys Leu Arg Gln Ser Gly Tyr Arg Leu Val Tyr  
                          50                      55                      60  
 Gln Val Glu Asn Asp Ile Ile Val Val Thr Val Leu Ala Val Gly Lys  
 65                      70                      75                      80  
 Arg Glu Arg Ser Glu Val Tyr Thr Lys Ala Leu Gln Arg Leu Asp Asp  
                          85                      90                      95

<210> 18  
 <211> 87  
 <212> PRT  
 <213> Mycobacterium tuberculosis #1

<220>  
 <223> protein relE-Mt1

<400> 18  
 Met Pro Tyr Thr Val Arg Phe Thr Thr Thr Ala Arg Arg Asp Leu His  
 1                      5                      10                      15  
 Lys Leu Pro Pro Arg Ile Leu Ala Ala Val Val Glu Phe Ala Phe Gly  
                          20                      25                      30  
 Asp Leu Ser Arg Glu Pro Leu Arg Val Gly Lys Pro Leu Arg Arg Glu  
                          35                      40                      45  
 Leu Ala Gly Thr Phe Ser Ala Arg Arg Gly Thr Tyr Arg Leu Leu Tyr  
                          50                      55                      60  
 Arg Ile Asp Asp Glu His Thr Thr Val Val Ile Leu Arg Val Asp His  
 65                      70                      75                      80  
 Arg Ala Asp Ile Tyr Arg Arg  
                          85

<210> 19  
 <211> 97  
 <212> PRT  
 <213> Mycobacterium tuberculosis #2

<220>  
 <223> protein relE-Mt2

<400> 19  
 Met Ser Asp Asp His Pro Tyr His Val Ala Ile Thr Ala Thr Ala Ala  
 1                      5                      10                      15  
 Arg Asp Leu Gln Arg Leu Pro Glu Lys Ile Ala Ala Ala Cys Val Glu  
                          20                      25                      30  
 Phe Val Phe Gly Pro Leu Leu Asn Asn Pro His Arg Leu Gly Lys Pro  
                          35                      40                      45  
 Leu Arg Asn Asp Leu Glu Gly Leu His Ser Ala Arg Arg Gly Asp Tyr  
                          50                      55                      60  
 Arg Val Val Tyr Ala Ile Asp Asp Gly His His Arg Val Glu Ile Ile  
 65                      70                      75                      80  
 His Ile Ala Arg Arg Ser Ala Ser Tyr Arg Met Asn Pro Cys Arg Pro  
                          85                      90                      95

Arg

<210> 20  
<211> 102  
<212> PRT  
<213> Haemophilus influenzae

<220>  
<223> protein RelE-Hi

<400> 20  
Met Ser Glu Glu Lys Pro Leu Lys Val Ser Tyr Ser Lys Gln Phe Val  
1 5 10 15  
Arg Asp Leu Thr Asp Leu Ala Lys Arg Ser Pro Asn Val Leu Ile Gly  
20 25 30  
Ser Lys Tyr Ile Thr Ala Ile His Cys Leu Leu Asn Arg Leu Pro Leu  
35 40 45  
Pro Glu Asn Tyr Gln Asp His Ala Leu Val Gly Glu Trp Lys Gly Tyr  
50 55 60  
Arg Asp Cys His Ile Gln Gly Asp Leu Val Leu Ile Tyr Gln Tyr Val  
65 70 75 80  
Ile Gln Asp Glu Phe Asp Glu Leu Lys Phe Ser Arg Leu Asn Ile His  
85 90 95  
Ser Gln Thr Ala Leu Lys  
100

<210> 21  
<211> 92  
<212> PRT  
<213> E. coli K-12

<220>  
<223> protein relEk12sos

<400> 21  
Met Ile Gln Arg Asp Ile Glu Tyr Ser Gly Gln Tyr Ser Lys Asp Val  
1 5 10 15  
Lys Leu Ala Gln Lys Arg His Lys Asp Met Asn Lys Leu Lys Tyr Leu  
20 25 30  
Met Thr Leu Leu Ile Asn Asn Thr Leu Pro Leu Pro Ala Val Tyr Lys  
35 40 45  
Asp His Pro Leu Gln Gly Ser Trp Lys Gly Tyr Arg Asp Ala His Val  
50 55 60  
Glu Pro Asp Trp Ile Leu Ile Tyr Lys Leu Thr Asp Lys Leu Leu Arg  
65 70 75 80  
Phe Glu Arg Thr Gly Thr His Ala Ala Leu Phe Gly  
85 90

<210> 22  
<211> 88  
<212> PRT  
<213> Helicobacter pylori



<220>

<223> protein RelE-Hp

<400> 22

Met Leu Lys Leu Asn Leu Lys Lys Ser Phe Gln Lys Asp Phe Asp Lys  
1 5 10 15  
Leu Leu Leu Asn Gly Phe Asp Asp Ser Val Leu Asn Glu Val Ile Leu  
20 25 30  
Thr Leu Arg Lys Lys Glu Pro Leu Asp Pro Gln Phe Gln Asp His Ala  
35 40 45  
Leu Lys Gly Lys Trp Lys Pro Tyr Arg Glu Cys His Ile Lys Pro Asp  
50 55 60  
Val Leu Leu Val Tyr Leu Val Lys Asp Asp Glu Leu Ile Leu Leu Arg  
65 70 75 80  
Leu Gly Ser His Ser Glu Leu Phe  
85

<210> 23

<211> 92

<212> PRT

<213> Archaeoglobus fulgidus #2

<220>

<223> protein RelE-Af2

<400> 23

Met Ala Trp Lys Val Arg Tyr His Lys Lys Ala Ile Lys Phe Leu Glu  
1 5 10 15  
Lys Leu Asp Glu Gly Lys Arg Ser Ile Leu Leu Ser Lys Ile Gln Glu  
20 25 30  
Leu Val Asn Ser Leu Glu Ser Gly Val Leu Pro Ile Gln Arg Met Asp  
35 40 45  
Ile Lys Arg Leu Lys Gly Val Trp Asp Gly Phe Leu Arg Leu Arg Val  
50 55 60  
Gly Glu Val Arg Ile Ile Phe Lys Ile Asn Val Glu Asp Glu Thr Ile  
65 70 75 80  
Phe Ile Tyr Ser Ile His Phe Arg Glu Lys Val Tyr  
85 90

<210> 24

<211> 86

<212> PRT

<213> Archaeoglobus fulgidus #4

<220>

<223> protein RelE-Af4

<400> 24

Met Asn Glu Val Leu Ile His Lys Lys Phe Leu Asp Gly Leu Asp Ser  
1 5 10 15  
Gly Arg Arg Ser Lys Val Leu Asp Ala Ile Arg Met Leu Lys Asp Phe  
20 25 30  
Pro Ile Ile Arg Ala Asp Ile Lys Lys Ile Gly Pro Lys Thr Tyr Arg  
35 40 45  
Leu Arg Lys Gly Glu Ile Arg Ile Ile Phe Asp Phe Asp Ile Gly Thr

50                      55                      60  
 Asn Arg Val Phe Val Lys Phe Ala Ala Ser Glu Gly Val Phe Thr Lys  
 65                      70                      75                      80  
 Thr Glu Glu Lys Phe Phe  
                          85

<210> 25  
 <211> 85  
 <212> PRT  
 <213> Archaeoglobus fulgidus #3

<220>  
 <223> protein RelE-Af3

<400> 25  
 Met Asn Tyr Lys Ala Gln Phe Ser Glu Glu Phe Leu Lys Ile Ala Lys  
 1                      5                      10                      15  
 Lys Leu Lys Glu Lys Asp Pro Glu Leu Lys Arg Leu Gln Ser Lys  
                          20                      25                      30  
 Val Glu Glu Ile Ile Lys Gln Pro Glu His Tyr Lys Pro Leu Arg Gly  
                          35                      40                      45  
 Gln Met Lys Gly Leu Arg Arg Ala His Val Gly Lys Phe Val Ile Ile  
 50                      55                      60  
 Phe Lys Val Glu Glu Asp Thr Val Lys Phe Val Thr Phe Lys His His  
 65                      70                      75                      80  
 Asn His Ala Tyr Lys  
                          85

<210> 26  
 <211> 120  
 <212> PRT  
 <213> Synechosystis

<220>  
 <223> protein RelE-Sy

<400> 26  
 Met Ser Asn Asn Leu His Leu Val Asn Ile Asp Phe Thr Pro Glu Tyr  
 1                      5                      10                      15  
 Arg Arg Ser Leu Lys Tyr Leu Ala Lys Lys Tyr Arg Asn Ile Arg Ser  
                          20                      25                      30  
 Asp Val Gln Pro Ile Ile Glu Ala Leu Gln Lys Gly Val Ile Ser Gly  
                          35                      40                      45  
 Asp Arg Leu Ala Gly Phe Gly Ser Asp Ile Tyr Val Tyr Lys Leu Arg  
 50                      55                      60  
 Ile Lys Asn Ser Asn Ile Gln Lys Gly Lys Ser Ser Gly Tyr Arg Leu  
 65                      70                      75                      80  
 Ile Tyr Leu Leu Glu Ser Glu Asn Ser Ile Leu Leu Leu Thr Ile Tyr  
                          85                      90                      95  
 Ser Lys Ala Glu Gln Glu Asp Ile Ala Ala Ser Asp Ile Asn Ser Ile  
                          100                      105                      110  
 Leu Gly Glu Tyr Ser Ile Glu Asp  
                          115                      120

<210> 27  
 <211> 86  
 <212> PRT  
 <213> Bacterium

<220>  
 <223> protein RelB-SOS

<400> 27  
 Met Ala Ala Asn Ala Phe Val Arg Ala Arg Ile Asp Glu Asp Leu Lys  
 1 5 10 15  
 Asn Gln Ala Ala Asp Val Leu Ala Gly Met Gly Leu Thr Ile Ser Asp  
 20 25 30  
 Leu Val Arg Ile Thr Leu Thr Lys Val Ala Arg Glu Lys Ala Leu Pro  
 35 40 45  
 Phe Asp Leu Arg Glu Pro Asn Gln Leu Thr Ile Gln Ser Ile Lys Asn  
 50 55 60  
 Ser Glu Ala Gly Ile Asp Val His Lys Ala Lys Asp Ala Asp Asp Leu  
 65 70 75 80  
 Phe Asp Lys Leu Gly Ile  
 85

<210> 28  
 <211> 82  
 <212> PRT  
 <213> Vibrio cholerae

<220>  
 <223> protein RelB-Vc

<400> 28  
 Met Thr Thr Arg Ile Leu Ala Asp Val Ala Ala Ser Ile Thr Glu Phe  
 1 5 10 15  
 Lys Ala Asn Pro Met Lys Val Ala Thr Ser Ala Phe Gly Ala Pro Val  
 20 25 30  
 Ala Val Leu Asn Arg Asn Glu Pro Ala Phe Tyr Cys Val Pro Ala Ser  
 35 40 45  
 Thr Tyr Glu Ile Met Met Asp Lys Leu Glu Asp Leu Glu Leu Leu Ala  
 50 55 60  
 Ile Ala Lys Glu Arg Leu Ser Glu Asp Ser Val Ser Val Asn Ile Asp  
 65 70 75 80  
 Asp Leu

<210> 29  
 <211> 83  
 <212> PRT  
 <213> Bacillus thurigiensis

<220>  
 <223> protein RelB

<400> 29  
 Met Pro Asn Ile Ile Leu Ser Asp Thr Ser Ala Ser Val Ser Glu Leu  
 1 5 10 15

Lys Lys Asn Pro Met Ala Thr Val Ser Ala Gly Asp Gly Phe Pro Val  
                   20                  25                  30  
 Ala Ile Leu Asn Arg Asn Gln Pro Ala Phe Tyr Cys Val Pro Ala Glu  
                   35                  40                  45  
 Leu Tyr Glu Lys Met Leu Asp Ala Leu Asp Asp Gln Glu Leu Val Lys  
                   50                  55                  60  
 Leu Val Ala Glu Arg Ser Asn Gln Pro Leu His Asp Val Asp Leu Asp  
                   65                  70                  75                  80  
 Lys Tyr Leu

<210> 30  
 <211> 93  
 <212> PRT  
 <213> Mycobacterium tuberculosis #1

<220>  
 <223> protein RelB-Mt1

<400> 30  
 Met Arg Ile Leu Pro Ile Ser Thr Ile Lys Gly Lys Leu Asn Glu Phe  
   1                  5                  10                  15  
 Val Asp Ala Val Ser Ser Thr Gln Asp Gln Ile Thr Ile Thr Lys Asn  
                   20                  25                  30  
 Gly Ala Pro Ala Ala Val Leu Val Gly Ala Asp Glu Trp Glu Ser Leu  
                   35                  40                  45  
 Gln Glu Thr Leu Tyr Trp Leu Ala Gln Pro Gly Ile Arg Glu Ser Ile  
                   50                  55                  60  
 Ala Glu Ala Asp Ala Asp Ile Ala Ser Gly Arg Thr Tyr Gly Glu Asp  
                   65                  70                  75                  80  
 Glu Ile Arg Ala Glu Phe Gly Val Pro Arg Arg Pro His  
                   85                  90

<210> 31  
 <211> 89  
 <212> PRT  
 <213> Mycobacterium tuberculosis #2

<220>  
 <223> protein RelB-Mt2

<400> 31  
 Met Ala Val Val Pro Leu Gly Glu Val Arg Asn Arg Leu Ser Glu Tyr  
   1                  5                  10                  15  
 Val Ala Glu Val Glu Leu Thr His Glu Arg Ile Thr Ile Thr Arg His  
                   20                  25                  30  
 Gly His Pro Ala Ala Val Leu Ile Ser Ala Asp Asp Leu Ala Ser Ile  
                   35                  40                  45  
 Glu Glu Thr Leu Glu Val Leu Arg Thr Pro Gly Ala Ser Glu Ala Ile  
                   50                  55                  60  
 Arg Glu Gly Leu Ala Asp Val Ala Ala Gly Arg Phe Val Ser Asn Asp  
                   65                  70                  75                  80  
 Glu Ile Arg Asn Arg Tyr Thr Ala Arg  
                   85

<210> 32  
 <211> 97  
 <212> PRT  
 <213> E. coli K-12

<220>  
 <223> protein RelB-K12-2

<400> 32  
 Met His Arg Ile Leu Ala Glu Lys Ser Val Asn Ile Thr Glu Leu Arg  
 1 5 10 15  
 Lys Asn Pro Ala Lys Tyr Phe Ile Asp Gln Pro Val Ala Val Leu Ser  
 20 25 30  
 Asn Asn Arg Pro Ala Gly Tyr Leu Ser Ala Ser Ala Phe Glu Ala  
 35 40 45  
 Leu Met Asp Met Leu Ala Glu Gln Glu Glu Lys Lys Pro Ile Lys Ala  
 50 55 60  
 Arg Phe Arg Pro Ser Ala Ala Arg Leu Glu Glu Ile Thr Arg Arg Ala  
 65 70 75 80  
 Glu Gln Tyr Leu Asn Asp Met Thr Asp Asp Asp Phe Asn Asp Phe Lys  
 85 90 95  
 Glu

<210> 33  
 <211> 68  
 <212> PRT  
 <213> Salmonella typhimurium

<220>  
 <223> protein RelB-St

<400> 33  
 Met Phe Met Arg Thr Val Asn Tyr Ser Glu Ala Arg Gln Asn Leu Ala  
 1 5 10 15  
 Glu Val Leu Glu Ser Ala Val Thr Gly Gly Pro Val Thr Ile Thr Arg  
 20 25 30  
 Arg Gly His Lys Ser Ala Val Ile Ser Ala Glu Glu Phe Glu Arg  
 35 40 45  
 Tyr Gln Thr Ala Arg Met Asp Asp Glu Phe Ala Ala Ile Met Ala Val  
 50 55 60  
 His Gly Asn Glu  
 65

<210> 34  
 <211> 79  
 <212> PRT  
 <213> E. coli

<220>  
 <223> protein RelB-coli

<400> 34  
 Met Gly Ser Ile Asn Leu Arg Ile Asp Asp Glu Leu Lys Ala Arg Ser

1 5 10 15  
 Tyr Ala Ala Leu Glu Lys Met Gly Val Thr Pro Ser Glu Ala Leu Arg  
 20 25 30  
 .Leu Met Leu Glu Tyr Ile Ala Asp Asn Glu Arg Leu Pro Phe Lys Gln  
 35 40 45  
 Thr Leu Leu Ser Asp Glu Asp Ala Glu Leu Val Glu Ile Val Lys Glu  
 50 55 60  
 Arg Leu Arg Asn Pro Lys Pro Val Arg Val Thr Leu Asp Glu Leu  
 65 70 75

<210> 35  
 <211> 98  
 <212> PRT  
 <213> Haemophilus influenzae

<220>  
 <223> protein RelB-Hi

<400> 35  
 Met Ala Leu Thr Asn Ser Ser Ile Ser Phe Arg Thr Val Glu Lys Thr  
 1 5 10 15  
 Lys Leu Glu Ala Tyr Gln Val Ile Glu Gln Tyr Gly Leu Thr Pro Ser  
 20 25 30  
 Gln Val Phe Asn Met Phe Leu Ala Gln Ile Ala Lys Thr Arg Ser Ile  
 35 40 45  
 Pro Val Asp Leu Asn Tyr Leu Arg Pro Asn Lys Glu Thr Leu Ala Ala  
 50 55 60  
 Ile Asp Glu Leu Asp Ser Gly Asn Ala Glu Ser Phe Phe Ile Glu Ala  
 65 70 75 80  
 Ser Glu Asn Tyr Ser Ala Glu Glu Phe Thr Lys Arg Ile Leu Asn Gly  
 85 90 95  
 Gly Gln

<210> 36  
 <211> 82  
 <212> PRT  
 <213> Methanococcus jannaschii

<220>  
 <223> protein RelB-Mj

<400> 36  
 Met Leu Asn Ile Asn Lys Glu Ile Ala Gln Ile Glu Thr Glu Leu Asn  
 1 5 10 15  
 Glu Leu Lys Lys Leu Arg Asp Glu Ile Ser Glu Arg Ile Glu Lys Leu  
 20 25 30  
 Glu Ile Lys Leu Leu Lys Leu Lys Ala Leu Ala Ile Pro Glu Glu Glu  
 35 40 45  
 Phe Glu Glu Asp Tyr Glu Glu Ile Ile Glu Asp Val Lys Lys Ser Leu  
 50 55 60  
 Asp Lys Lys Glu Thr Val Pro Ala Glu Glu Ala Leu Lys Glu Leu Gly  
 65 70 75 80  
 Leu Leu

<210> 37  
<211> 65  
<212> PRT  
<213> Archaeoglobs fulgidus #1

<220>  
<223> protein RelB-Af1

<400> 37  
Met Asn Glu Ala Leu Leu Arg Glu Ile Tyr Ser Glu Val Lys Lys Ile  
1 5 10 15  
Arg Glu Lys Ile Glu Gln Leu Glu Glu Leu Ile Ile Pro Ala Glu Lys  
20 25 30  
Val Ser Glu Glu Glu Leu Leu Glu Ile Arg Lys Leu Lys Glu Glu Ser  
35 40 45  
Leu Lys Gly Glu His Val Asp Trp Asp Glu Leu Lys Arg Glu Leu Gly  
50 55 60  
Val  
65

<210> 38  
<211> 72  
<212> PRT  
<213> Archaeoglobus fulgidus #3

<220>  
<223> protein RelB-Af3

<400> 38  
Met Lys Val Leu Leu Asp Ile Ile Glu Asp Ile Glu Asn Phe Ile Arg  
1 5 10 15  
Gln Leu Glu Lys Arg Arg Gly Glu Leu Glu Glu Leu Lys Asp Glu Ile  
20 25 30  
Leu Ile Phe Ser Asp Ala Glu Phe Ile Asp Ser Ile Gln Arg Gly Leu  
35 40 45  
Ser Asp Leu Glu Gln Gly Arg Ser Lys Val Cys Ser Asn Leu Glu Glu  
50 55 60  
Val Lys Lys Leu Phe Glu Asp Ile  
65 70

<210> 39  
<211> 62  
<212> PRT  
<213> Archaeoglobus fulgidus #2

<220>  
<223> protein RelB-Af2

<400> 39  
Met Glu Val Ile Gln Ile Ser Lys Asp Glu Leu Glu Glu Ile Ile Glu  
1 5 10 15  
Arg Lys Phe Lys Glu Val Leu Ile Lys Ala Leu Met Glu Ile Thr Pro  
20 25 30

Tyr Val Ser Asp Glu Glu Gln Glu Glu Ile Asp Lys Ile Ala Gly Lys  
 35 40 45  
 Pro Asp Glu Tyr Glu Gly Glu Phe Glu Glu Trp His Gly Lys  
 50 55 60

<210> 40  
 <211> 57  
 <212> PRT  
 <213> Archaeoglobus fulgidus #4

<220>  
 <223> protein RelB-Af4

<400> 40  
 Met Asp Ile Gln Val Ile Lys Gln Ala Val Arg Glu Val Leu Arg Glu  
 1 5 10 15  
 Glu Leu Pro Ser Ile Leu Lys Glu Val Ile Leu Ser Thr Ile Pro Pro  
 20 25 30  
 Asp Glu Pro Glu Ala Asp Glu Lys Gln Phe Val Asp Glu Glu Ile Asn  
 35 40 45  
 Glu Asp Asp Tyr Val Lys Phe Asp Glu  
 50 55

<210> 41  
 <211> 95  
 <212> PRT  
 <213> Helicobacter pyloris

<220>  
 <223> protein RelB-Hp

<400> 41  
 Met Pro Asn Thr Thr Asn Lys Asp Tyr Thr Lys Tyr Ser Gln Arg Gln  
 1 5 10 15  
 Leu Phe Ser Phe Leu Asn Ser Ile Lys Thr Lys Gln Lys Arg Ala Leu  
 20 25 30  
 Glu Lys Leu Lys Glu Ile Gln Ala Gln Lys Gln Arg Ile Lys Lys Ala  
 35 40 45  
 Leu Gln Phe Lys Ala Leu Asn Leu Thr Glu Asn Gly Tyr Thr Ile Glu  
 50 55 60  
 Glu Glu Arg Glu Ile Leu Ala Arg Ala Lys Asp Thr Lys Asn Arg Leu  
 65 70 75 80  
 Cys Phe Lys Ser Ile Glu Asp Phe Lys Lys His Cys Glu Asn Leu  
 85 90 95

<210> 42  
 <211> 86  
 <212> PRT  
 <213> Synechosystis

<220>  
 <223> protein RelB-syneco

<400> 42



Met Met Arg Ala Phe Glu Val Met Ala Thr Val Lys Asp Ser Lys Gln  
 1 5 10 15  
 Leu Leu Leu Asp Ser Asp Leu His Trp Asn Thr Ser Arg Val Lys Val  
 20 25 30  
 Ile Ile Leu Glu Ser Asp Glu Leu Ala Ser Lys Gly Ser Glu Phe Asp  
 35 40 45  
 Pro Asp Asp Thr Pro Val Glu Glu Ile Lys Val Ser Leu Arg Lys Ala  
 50 55 60  
 Leu Glu Glu Tyr Lys Gln Gly Lys Arg Ile Pro Val Glu Asn Met Trp  
 65 70 75 80  
 Glu Gly Ile Asp Val Glu  
 85

<210> 43  
 <211> 85  
 <212> PRT  
 <213> Bacillus thurigiensis

<220>  
 <223> protein RelB-BT

<400> 43  
 Met Ala Ile Arg Lys Asp Glu Leu Tyr Arg Leu Ile Asp His Leu Asp  
 1 5 10 15  
 Gln Gln Asp Glu Lys Ala Ala Phe Asp Phe Leu Glu Phe Leu Val Gln  
 20 25 30  
 Arg Ser Arg Arg Lys Pro Lys Glu Trp Glu Lys Ile Asp Met Ala Asp  
 35 40 45  
 Pro Asp His Glu Pro Leu Ser Thr Gln Glu Leu Glu Gln Leu Asn Ser  
 50 55 60  
 Glu Glu Gly Tyr Val Ser Gly Glu Asp Ala Lys Arg Glu Phe Gly Leu  
 65 70 75 80  
 Gln Ile Asp Leu Pro  
 85

<210> 44  
 <211> 1280  
 <212> DNA  
 <213> E. coli plasmid P307

<220>  
 <223> n = A,T,C or G

<400> 44  
 gagtatcata ttaggatacg ggtgggtgac gccacactct ggcatagaac ggacattcat 60  
 tgatgccatg ccagaatgga cgttcagggtt attccgtcca gttctgctgg caacgcgaga 120  
 tctcccctgg tatagtgat ccacagcaaa gcgctcaaac agggataata tgatggaaat 180  
 caaggctcaa cagttttgtc acatcaacgg ggcggcaagt ccttactgac aacggacaac 240  
 aaggatgagg cggcgtggcg ggtatcggtt ccacgactga aaagcatcag gggcgcgtgg 300  
 cggaagcgat ttttgcgaac tgcgcggaac tggataacga ccagcttaac gagatcatcg 360  
 agtgggttcg gctctatcag cgctgaatgc cactatcagg ctgcgcaagc ggcccttttt 420  
 acgccccttg ttttaattccc gcactacctg gacgttcagg tgattctgtc catctgtaca 480  
 aaaaacaata aaagacttgt rbmrnataac aggtcatgta aggagtatct ttgagactgg 540  
 ttaaacagtc ttgaaasdrt artrbgtgg cctatgccta acattattct cagtgtatca 600  
 agcgccagtg tcagcgagct gaagaaaaac ccgatggcga cagtcagcgc cggatgatgg 660

ttccccggtcg ctatcctgaa ccgtaatcag cctgctttct actgtgtacc cgcagagctg 720  
 tacgaaaaga tgcttgatgc cctagacgat caggagttgg ttaaasdctg gtagccgaac 780  
 gcagcaacca accgctgcat gatgtagatc tggataandr bstartrata cctatgaggt 840  
 atcaggtaaa attcagggaa gatgcgctga aagagtggca aaaactggac aaggctattc 900  
 agcaacagtt tgcgaaaaag ctaaaaaagt gctgtgacaa tccgcatatt ccttccgcaa 960  
 aactgcgtgg gataaaggac tgctacaaaa taaaattacg tgcgtcaggt tttcgcttg 1020  
 tctatcaggt gattgacgaa caattaatta tcgctgttgt agctgtgggt aaacgtgndr 1080  
 agcgcagtga cgtttataat cttgccagcg aaagaatgag ataaaagcaa taaacacaga 1140  
 aagttactct ggcgttatgg ggtaatgcaa agtatgagtc gtagagggaa ttgcctggat 1200  
 aattcgccga tggaaagagt ctttcgcagc cttaaaagt aatggcttcc gaaaggtgg 1260  
 tatggtgatt ttagccatgc 1280

<210> 45

<211> 1168

<212> DNA

<213> B. thurigiensis

<220>

<223> n = A,T,C or G

<400> 45

ctcggttttt ctggttggtac aaacttaatt gattttgaat aatttgtttg taccagtcct 60  
 ttttgcttag cccagtcaaa ataacgtttg attgaattaa tgcgccggtt aatcgtagaa 120  
 ggttttagta atcttgtaac ttgcatatgc cctcgatata gagcaatagt gcgagcggta 180  
 acttctattg gatgaaaaag agtatcctca gcatgttttc cccacacatt ttcaaacc 240  
 aatacaaaat cttttaaatc actcgtatat tcttttagtg tttttgtatg caaatctcct 300  
 tcttgagata agctagaaat aaaatcggaa atcaaagatg ttgcttgat agaaattgtt 360  
 ttagtggaat gcataaatac ctccctctttt attgacttac rbbtmrnaat tagcggacat 420  
 gatattttta tcttatcaat tatggttagcg gacatcaaac atttattttc ccacacttca 480  
 tgtccactaa tattaattag tggacattr dstarttrbta aaactatctc gaaagtaggt 540  
 gtaacacatg gctattcgta aagatgaatt gtatcgggta attgatcacc tggatcaaca 600  
 agatgaaaaa gcagcatttg actttttaga atttcttggt caacgggtcaa gaagaaaacc 660  
 taaagaatgg gaaaaaattg atatggcaga tcctgatcat gaaccgctgt ctacacaaga 720  
 gttagaacag ttaaacagtg aagaaggata tgtatcaggg gaggacgcnd rbstartraa 780  
 aacgtgaatt cggactacaa attgatttac cataagtccg cggtgaaatt tattgcaaag 840  
 caagaaaaag ggattcaaaa aagaattgca gaaggattga agggacttct taagattcct 900  
 cctgaaggag atattaaaag tatgaaaggt tacacagaac tatatcgatt acggattgga 960  
 acctttcgaa ttttatttga aataaatcat gatgagaaag tcatatacat acaagcaatt 1020  
 ggaaatcgnd rtggtgacat ctataaataa ggcaaacatg cattttttaa agaaagggtc 1080  
 tctgaatcga agaacccttc tttttgtgt gcgaataatg tccgctaatt cttgttgctg 1140  
 gattctgttc cattgctaca catacccc 1168

<210> 46

<211> 1024

<212> DNA

<213> Methanococcus jannaschii

<220>

<223> n = A,T,C or G

<400> 46

ccgataccgt tgctggagac atagctggag ctttgaaggc ggagaagctt attttaataa 60  
 cagatgttga tggataaatg gatgatataa ataatccaga gacgttgcat agaaaattaa 120  
 cagcttcaga actaaaagaa atgatagaag atggaagaat aaaggaggag atgattccaa 180  
 aggctgaaag tgccttatat gccttagagc atggagttaa gagcgttcat ataataaatg 240  
 gaaagattcc tcatgctttg ttgttgagga tatttacaga ggagggtatt gggacgatga 300  
 taacaagaga ttaaagtttt tatattataa actacttaag aattaaaata starttrbmag 360

acaaataagg ggataactat gctcaatata aacaaagaga tagcacaaat agaaactgaa 420  
 ttgaatgaat tgaaaaaatt gagagatgaa atctctgaaa ggattgaaaa attagaaata 480  
 aagttattaa aattgaaagc attagctatt ccagaggagg aatttgaaga ggattatgaa 540  
 . gaaattatag aagatgttaa aaaatctctg gataaaaaag agactgtgcc agcagaagag 600  
 gctttgaand rbmstartm agaattggga ttattatgaa gtttaacgtt gagatacata 660  
 aaagagtctt aaaagattta aaggatttgc ctccctcaaa cttaaagaag tttaaagaac 720  
 taatagaaac attaaaaacc aatcccatc caaaagaaaa atttgatatt aaaagattaa 780  
 aaggcagtga tgaggtttat agagtttaga ttggaaaatt tagagttcaa tatgttgttt 840  
 tatgggatga tagaataata ataattagaa ndrmagataa gtagaagaga aggagcttat 900  
 aaaaatccct aagctattaa aaattctaatt ggctacattt ttatatctct tttcttaatt 960  
 caaatagaaa aaacagattc ggctgatacc atgattattc ttttagattt aaatggaaca 1020  
 atag 1024

<210> 47

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> primer Mj-relE/2CWW was used for amplification of  
relE gene from M. jannaschhii genomic DNA

<400> 47

ccccgaatt cgcattgcgcc attagaat

28

<210> 48

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> primer Mj-relE/1CW was used for amplification of  
relE gene from M. jannaschhii genomic DNA

<400> 48

cccccgatc cgagctcgag gctttgaaag aattggg

37

<210> 49

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> primer relB-J.jannCW was used for amplification of  
relB and relE from M. jannaschhii

<400> 49

ccccgatcc gtcgacgaca aataagggga taactatg

38

<210> 50

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> primer relE-Sp2/CW was used for amplification of  
relESP2 gene from S. pneumoniae genomic DNA

<400> 50  
ccccgcatcc gatgcatgat ttaggcttga ag 32

<210> 51  
<211> 34  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer relE-Sp2/CCW was used for amplification of  
relESP2 gene from S. pneumoniae genomic DNA

<400> 51  
ccccgaattc gaatgaaaat ttacttgaaa aaag 34

<210> 52  
<211> 58  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer relEk12 was used for the amplification of  
DNA fragments comprising genes relEk-12, relEP307  
and relEMj

<400> 52  
tgtaatacga ctactatag ataaggagtt ttataaatgg cgtattttct ggattttg 58

<210> 53  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer P2 was used for the amplification of DNA  
fragments comprising genes relEK-12, relEP307 and  
relEMj

<400> 53  
caccttcggt gcgaaacag 19

<210> 54  
<211> 58  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer relEP307 was used for the amplification of  
DNA fragments comprising genes relEK-12, relEP307  
and relEMj

<400> 54  
tgtaatacga ctactatag ataaggagtt ttataaatga ggtatcaggt aaaattca 58

<210> 55  
<211> 20

<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer P4 was used for the amplification of DNA  
fragments comprising genes relEK-12, relEP307 and  
relEMj

<400> 55  
ctttccatcg gcgaattatc

20

<210> 56  
<211> 58  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer relEMj was used for the amplification of  
DNA fragments comprising genes relEK-12, relEP307  
and relEMj

<400> 56  
tgtaatacga ctactatag ataaggagtt ttataaatga agtttaacgt tgagatac 58

<210> 57  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer P6 was used for the amplification of DNA  
fragments comprising genes relEK-12, relEP307 and  
relEMj

<400> 57  
atcatgttat cagccgaatc

20

<210> 58  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer S-relE was used for the amplification of  
the relE coding region from the plasmid pMG223

<400> 58  
taggtacat ggcgtatttt ctgg

24

<210> 59  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer AS-relE was used for the amplification of  
the relE coding region from the plasmid pMG223

<400> 59  
gagacccac actaccatcg gcg

23

12/2